EMERGENCY ACTION PLAN

PIKE CREEK DAM

City of Lewistown 305 West Watson Lewistown, Montana 59457

June 1995

Revised: July, 2008

If Pike Creek Dam is failing or failure seems imminent, call:

Fergus County Sheriff	535-3415 or 911
Fergus County Disaster and Emergency Services	535-8118
Leo Kapp	Office: 535-1770 Cell: 366-4430

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I. INTRODUCTION

A. <u>Purpose</u>

The purpose of this emergency action plan (EAP) is primarily to safeguard lives and secondarily to reduce property damage to the citizens of Fergus County living near the town of Lewistown, and along Big Spring Creek, in the event of flooding caused by a failure of Pike Creek Dam.

B. <u>Description of Dam</u>

Pike Creek Dam is in Fergus County, in Section 29, Township 15 North (T15N), Range 19 East (R19E), and located on Pike Creek. It is owned by the City of Lewistown, 305 West Watson Street, Lewistown, Montana 59457. Pike Creek Dam is used for flood control, sedimentation and recreation purposes. Technical data pertaining to Pike Creek Dam and its structures are shown in Appendix A.

C. Access to Dam

Pike Creek Dam is located off of a county road, about 4 miles Southeast of Lewistown. Note that the county road may become flooded!! The nearest telephone is at the residence of Jesse Burleigh, (406) 538-9712, ¼ mile downstream of the dam.

D. Hazard Area

The evacuation area is shown in Appendix B. Hazards include the possible inundation of occupied dwellings and roads. Inundation and evacuation maps are in Appendix B.

E. Responsibility and Authority

Pursuant to the Dam Safety Act, Chapter 15 of Title 85, MCA, the dam owner is responsible for production, coordination, maintenance, and implementation of this emergency action plan. The extent of owner implementation was defined through coordination of this plan with the County Sheriff and Disaster and Emergency Services (DES) coordinator.

F. Periodic Review/Update

The owner shall review/update this EAP annually. Review/update by a qualified professional engineer will be accomplished as required by the dam's operating permit, but no less than every five years.

G. Approval
By my signature, I acknowledge that I, or my representative, have reviewed this plan and agree to the tasks and responsibilities assigned herein for my department and/or agency.

DAM OWNER, CITY OF LEWISTOWN	Signature	Date	11/08/08
FERGUS COUNTY SHERIFF'S DEPART	Signature MENT	Date .	8 Ace 08
FERGUS COUNTY DISASTER AND EN	Signature MERGENCY SEI	l RVICES	Date 8/11/08

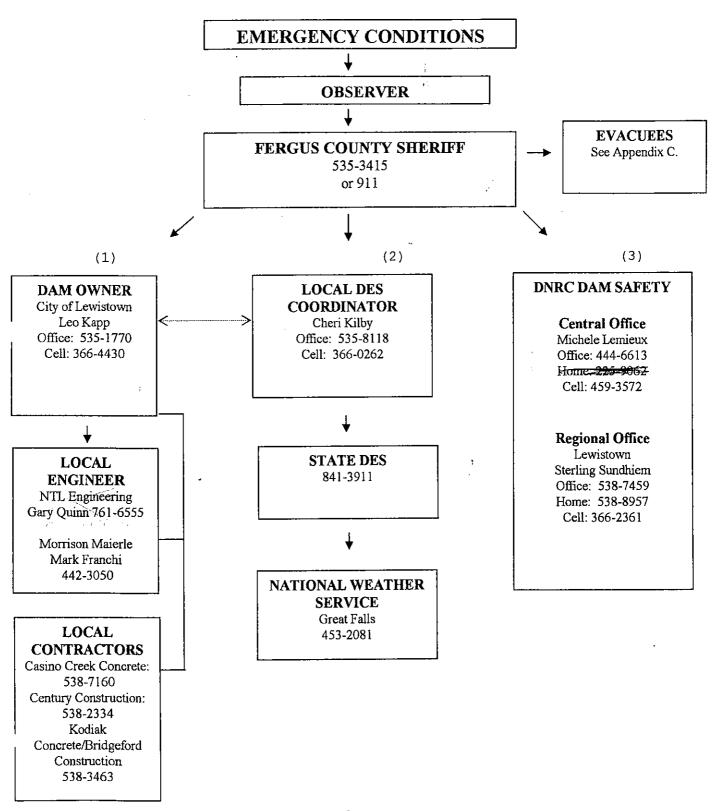
II. NOTIFICATION PROCEDURES

- A. Imminent or Actual Failure

 If PIKE CREEK DAM IS FAILING, TWO THINGS MUST BE

 DONE IMMEDIATELY:
 - (1) Residents in the hazard area downstream from the dam must be warned according to the county warning plan, and initiated as shown in Figure 1, and
 - Any steps that might save the dam or reduce damage to the dam or hazard area downstream should be taken. (Refer to the map in Appendix B to determine the areas that are likely to be inundated if the dam fails).

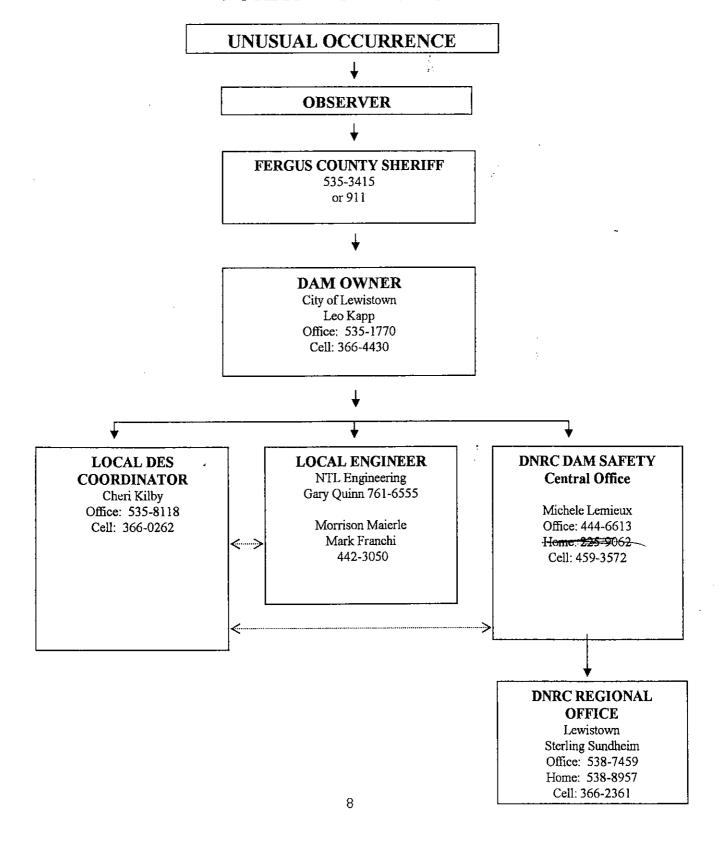
FIGURE 1 PIKE CREEK DAM ACTUAL OR IMMINENT FAILURE "NOTIFICATION FLOW CHART"



B. Potentially Hazardous Situation

A potentially hazardous situation is an event or condition not normally encountered in the routine operation of the dam and reservoir. Among the unusual occurrences that may affect the dam are dam embankment problems (see section B.2.), failure of the spillway or outlet works, heavy precipitation or rapid spring snow melt, landslides, earthquakes, erosion, theft, vandalism, acts of sabotage, and serious accidents. These occurrences may endanger the dam, the public, or the downstream valley and may necessitate a temporary or permanent revision of the dam's operating procedures. Help in these situations can be obtained by notifying those people shown in Figure 2.

FIGURE 2 PIKE CREEK DAM POTENTIALLY HAZARDOUS SITUATION "NOTIFICATION FLOW CHART"



- 1. If the dam owner discovers an unusual condition of the dam embankment that could threaten the structure:
 - a. Have a qualified engineer inspect the dam as soon as possible to determine whether emergency action is necessary.
 - b. Notify the county Disaster and Emergency Services Coordinator of the potential problem.
 - c. Contact the Dam Safety Program of the Department of Natural Resources and Conservation (DNRC).
- 2. Among the conditions the dam owner should watch for are:
 - a. Overtopping of the dam by floodwaters
 - b. Loss of material from the dam crest due to storm wave erosion
 - c. Slides on either the upstream or downstream slope of the embankment as evidenced by
 - 1. Sloughing
 - 2. Cracking
 - 3. Bulging
 - 4. Scarping
 - d. Erosional flows through, beneath, or around the embankment as evidenced by
 - 1. Excessive seepage
 - 2. Discoloration of the seepage
 - 3. Boils on the downstream side
 - 4. Sinkholes
 - 5. Changes in the flow from drains
 - e. Failure of outlets or spillways due to clogging or erosion
 - f. Movement of the dam on its foundation as evidenced by
 - 1. Misalignment
 - 2. Settlement
 - Cracking
- 3. Before calling either an engineer or DNRC to report a problem, the dam owner shall use the form in Appendix D to ensure sufficient information is provided for the engineer to analyze the problems. After talking to the engineer, it may be helpful to document the condition of the dam by making a sketch on the form in Appendix D, showing the extent of the problem. Revise the sketch periodically if the problem develops further. Section III includes further guidelines for courses of action to take mitigate the effect of many problems.
- C. <u>Posting of the Notification Flowchart and Distribution of the EAP.</u>
 The Notification Flowchart is posted with the Fergus County Sheriff's Office and the Fergus County DES Coordinator. A plan distribution list is found in Appendix E.

III. MITIGATION ACTIONS

Besides normal monitoring of the dam's condition, which is done at least monthly, the owner will provide continuous monitoring and inspection during and after extreme events such as storms and earthquakes. Information on the magnitude of an earthquake or storm can be obtained from the DNRC Dam Safety Program. Actions are suggested below to mitigate problems that may develop, but those actions should never be continued at the risk of injury or at the expense of lessening efforts related to evacuation. Monitoring should identify any of the following potential problems.

A. Potential Problems and Immediate Response Actions

- OVERTOPPING BY FLOOD WATERS
 - a. Open outlet to its maximum safe capacity.
 - b. Place sandbags along the crest to increase freeboard and force more water through the spillway and outlet.
 - c. Provide erosion-resistant protection to the downstream slope by placing plastic sheets or other materials over eroding areas.
 - d. Divert flood waters around the reservoir basin, if possible.
 - e. Create additional spillway capacity by making a controlled breach in a low embankment or dike section where the foundation materials are erosion-resistant.

2. LOSS OF FREEBOARD OR DAM CROSS SECTION DUE TO STORM WAVE EROSION

- a. Place additional riprap or sandbags in damaged areas to prevent further embankment erosion.
- b. Lower the water level to an elevation below the damaged area.

3. SLIDES IN THE UPSTREAM OR DOWNSTREAM SLOPE OF THE EMBANKMENT

- a. Lower the water level at a rate and to an elevation considered safe, given the slope condition. If the outlet is damaged or blocked, pumping, siphoning, or a controlled breach may be required.
- b. Stabilize slides on the downstream slope by
 - 1. weighting the toe area with additional soil, rock, or gravel, and then
 - 2. restoring lost freeboard by placing sandbags at the crest.

4. EROSIONAL FLOWS THROUGH THE EMBANKMENT, FOUNDATION, OR ABUTMENTS

- a. Plug the flow with whatever material is available (hay bales, bentonite, or plastic sheeting if the entrance to the leak is in the reservoir basin).
- b. Lower the water level until the flow decreases to a non-erosive velocity or stops.
- c. Place a protective sand-and-gravel filter or boil ring over the exit area to hold materials in place.

5. FAILURE OF APPURTENANT STRUCTURES SUCH AS OUTLETS OR SPILLWAYS

- a. Implement temporary measures to protect the damaged structure, such as closing an outlet or protecting a damaged spillway with riprap.
- b. Lower the water level to a safe elevation. If the outlet is inoperable, pumping, siphoning, or a controlled breach may be required.

6. MASS MOVEMENT OF THE DAM ON ITS FOUNDATION (SPREADING OR MASS SLIDING FAILURE)

a. Immediately lower the water level until excessive movement stops.

7. EXCESSIVE SEEPAGE AND HIGH LEVEL SATURATION OF THE EMBANKMENT

- a. Lower the water to a safe level.
- b. Continue frequent monitoring for signs of slides, cracking or concentrated seepage.

8. SPILLWAY BACKCUTTING, THREATENING RESERVOIR EVACUATION

- a. Reduce the flow over the spillway by fully opening the main outlet.
- b. Provide temporary protection at the point of erosion by placing sandbags, riprap materials, or plastic sheets weighted with sandbags.
- c. When the inflow subsides, lower the water to a safe level.

9. EXCESSIVE SETTLEMENT OF THE EMBANKMENT

- a. Lower the water level by releasing it through the outlet pumping, siphoning, or a controlled breach.
- b. If necessary, restore freeboard, preferably by placing sandbags.

B. Emergency Supplies and Resources
An emergency borrow area on the northwest side of the dam is shown in Figure 3.

C. <u>Local Contractors and Engineers</u>

Local Contractors: Casino Creek Concrete	538-2334
Engineers:	
NTL Engineering, Gary Quinn	761-6555
Morrison Maierle, Mark Franchi	442-3050

APPENDICES

APPENDIX A Technical Data

APPENDIX A

Technical Data For Pike Creek Dam

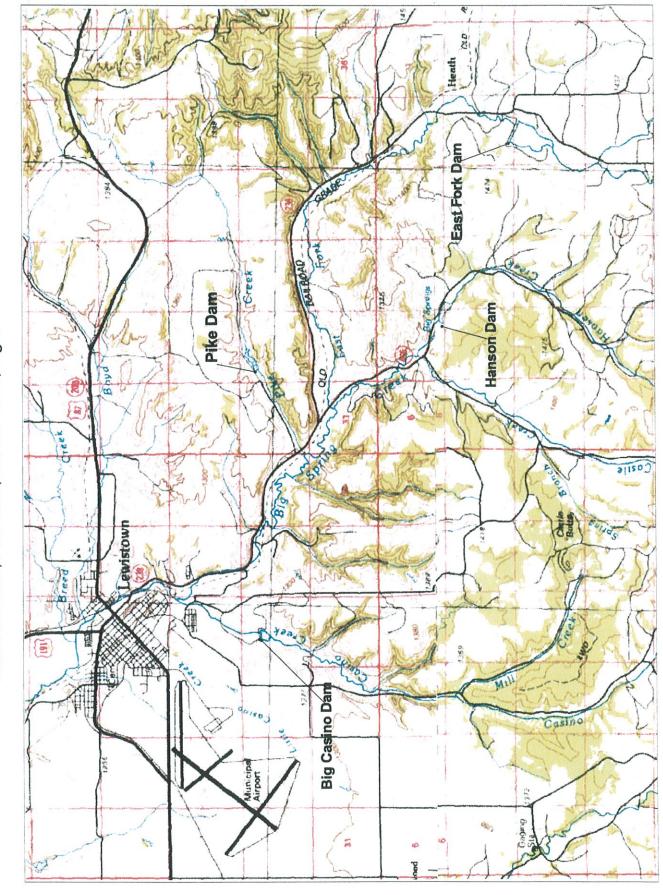
Max Reservoir Capacity to the Crest of the Dam: 780 acre feet Elev. 4169.4 ft NGVD
Normal Reservoir Capacity Measured to the Emergency Spillway Crest:
Dam Height Measured From Streambed to Crest of the Dam:
Dam Crest Width:
Length of Dam Crest: 800 feet
Outlet Capacity:
Spillway Capacity
Date Constructed
Slope of Upstream Face of Dam (Horizontal to Vertical) upper
Slope of Downstream Face of Dam (Horizontal to Vertical)2:1
Normal Reservoir capacity to the principle spillway:

APPENDIX B Inundation & Evacuation Maps

Kevin M. Premore--August 2001 Glendive Wifes City Lewistown Dams Overview Map East Fork Lake, Pike Lake, Hanson Lake, Big Casino Lake Harjowton Havre illoń Highways Counties Lakes Cities Legend

Lewistown Dams Inset Map

East Fork Lake, Pike Lake, Hanson Lake, Big Casino Lake







Evacuations should be made well beyond this zone. * Inundation lines are estimates.

Photo 1 of 13

Approximate Scale: Photo = 1/2 mile

Inundation Area Cross-section Key



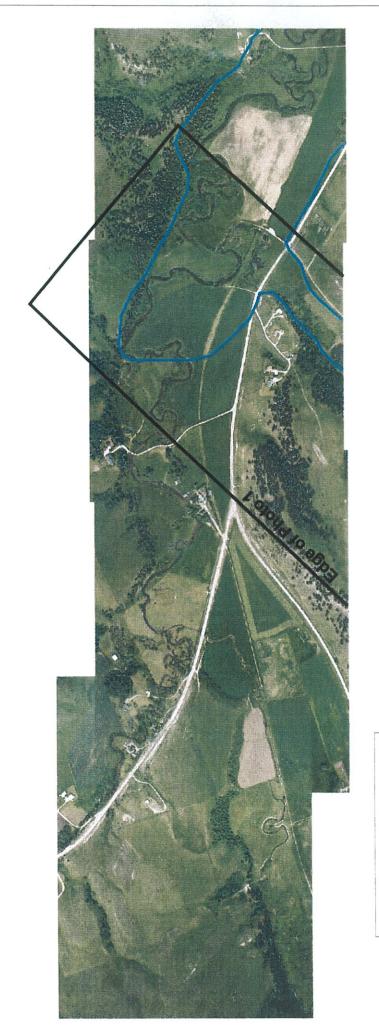


Photo 2 of 13

Inundation Area

Key

Evacuations should be made well beyond this zone. * Inundation lines are estimates.

Approximate Scale: Photo = 1 1/2 mile





Photo 3 of 13

Inundation Area Cross-section

Key

* Inundation lines are estimates.

Evacuations should be made well beyond this zone.

Approximate Scale: Photo = 2 miles



Time to peak height: 2 hr. 54 min Time to Peak: 2 hrs. 42 mins. Max. Depth: 14.4 ft.

Photo 4 of 13

Inundation Area Cross-section

Key

* Inundation lines are estimates.
Evacuations should be made well beyond this zone.

Approximate Scale: Photo = 1 1/2 mile



Photo 5 of 13

Inundation Area Cross-section

Key

* Inundation lines are estimates.

Evacuations should be made well beyond this zone.

Approximate Scale: Photo = 1 1/2 mile

Time to peak height: 3 hr. 12 min. Maximum depth: 20.2 ft.

Photo 6 of 13

Inundation Area

Key

Cross-section

 Inundation lines are estimates.
 Evacuations should be made well beyond this zone.

Approximate Scale: Photo = 1 mile



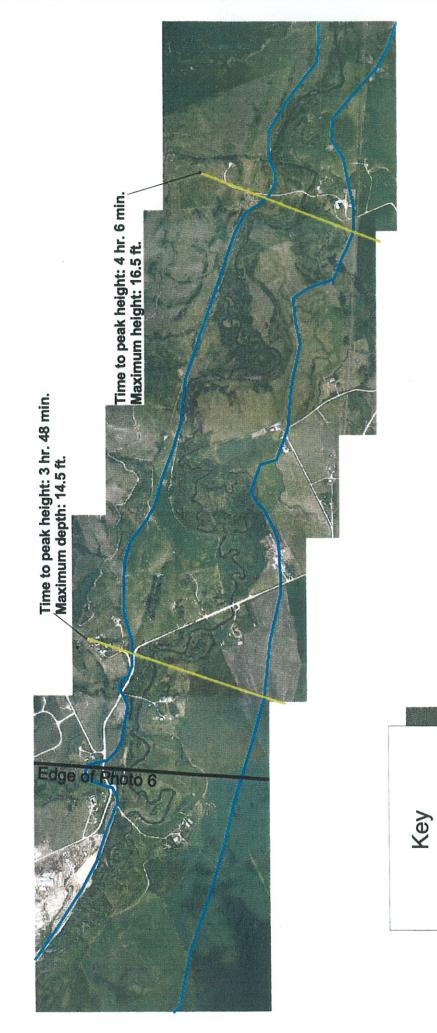


Photo 7 of 13

Inundation Area Cross-section

Cross-section

Evacuations should be made well beyond this zone. * Inundation lines are estimates.

Approximate Scale: Photo = 2 1/2 mile



* Inundation lines are estimates.

Evacuations should be made well beyond this zone.

Photo 8 of 13

Approximate Scale: Photo = 1 1/2 mile



Photo 9 of 13

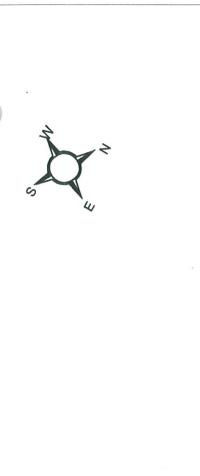
Evacuations should be made well beyond this zone. * Inundation lines are estimates.

Inundation Area

Key

Approximate Scale: Photo = 1 1/2 mile

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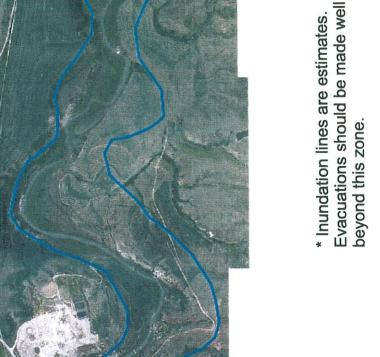


Photo 10 of 13

Inundation Area Cross-section

Key

Approximate Scale: Photo = 2 1/2 mile





Photo 11 of 13

* Inundation lines are estimates.

Evacuations should be made well beyond this zone.



Approximate Scale: Photo = 2 miles

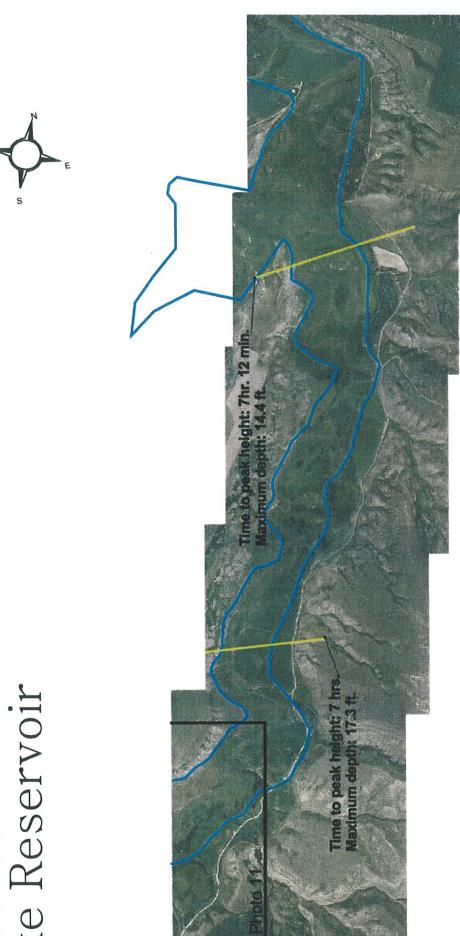


Photo 12 of 13

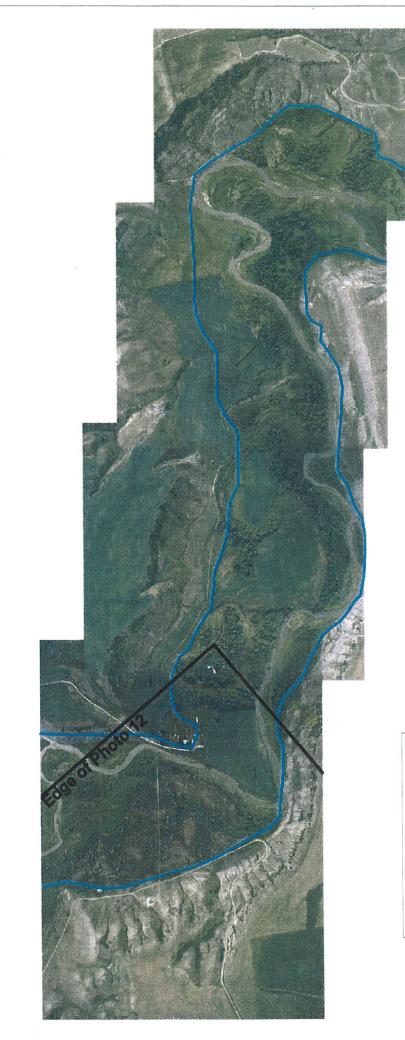
Inundation Area Cross-section

Key

* Inundation lines are estimates.

Evacuations should be made well beyond this zone.

Approximate Scale: Photo = 2 1/2 mile



Continued on Pike Dam Map 1

Photo 13 of 13

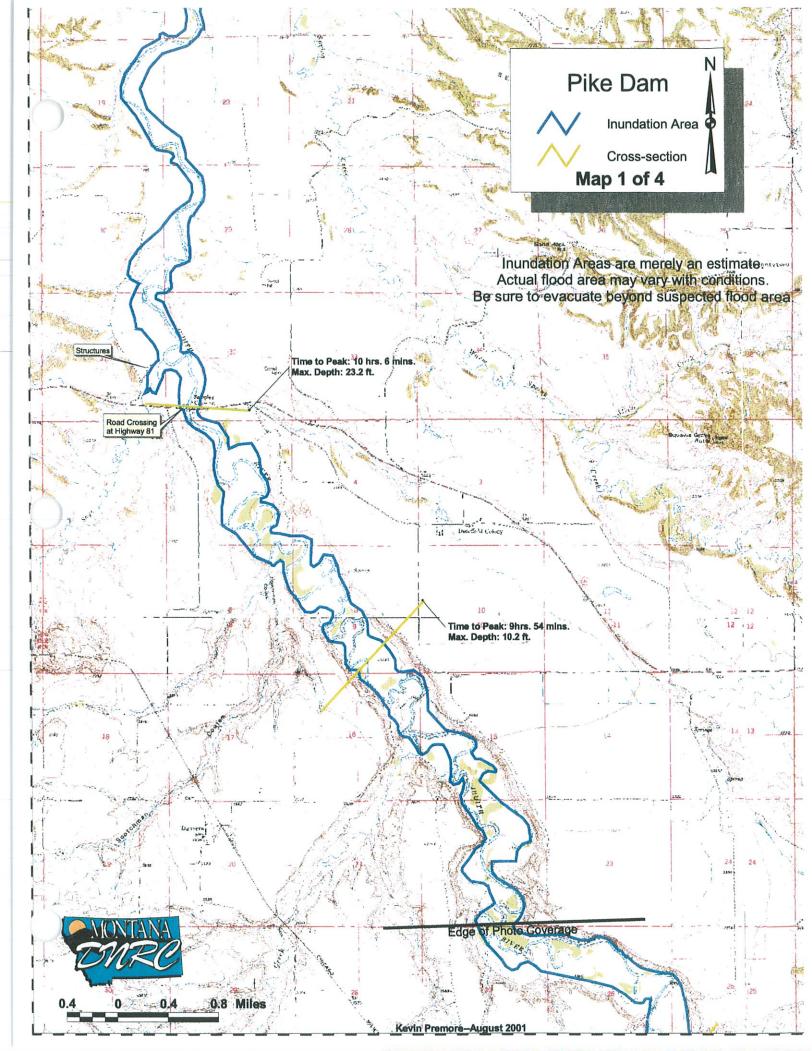
Inundation Area

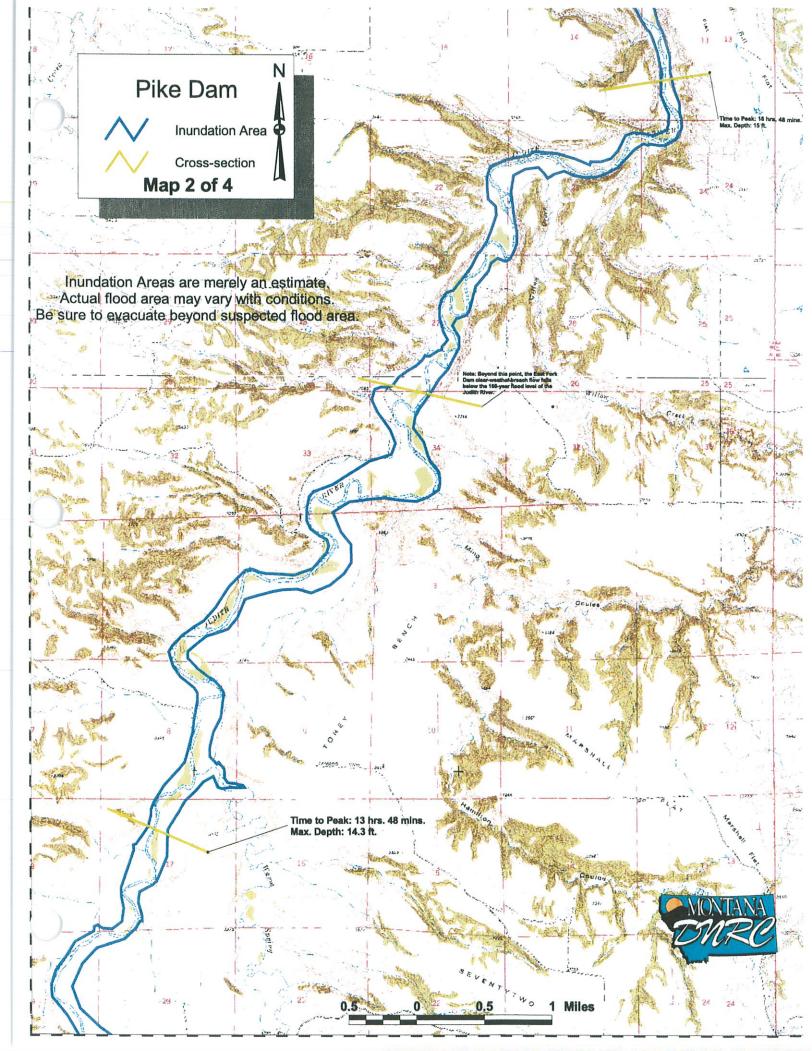
Key

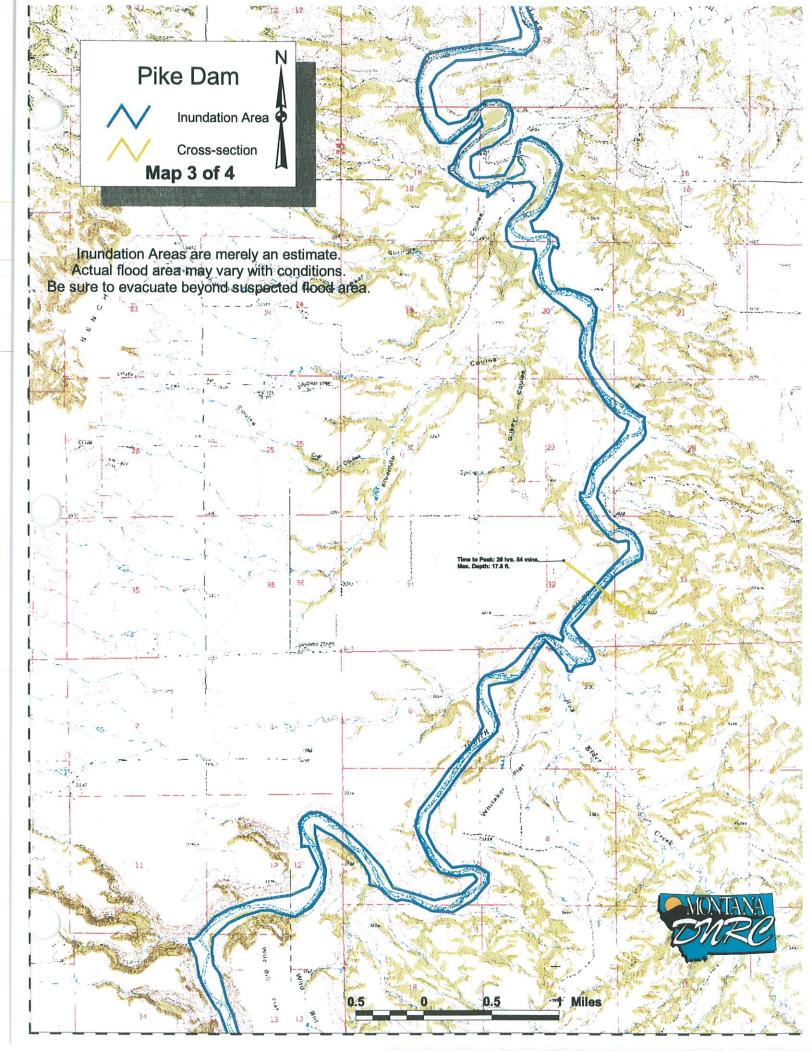
Cross-section

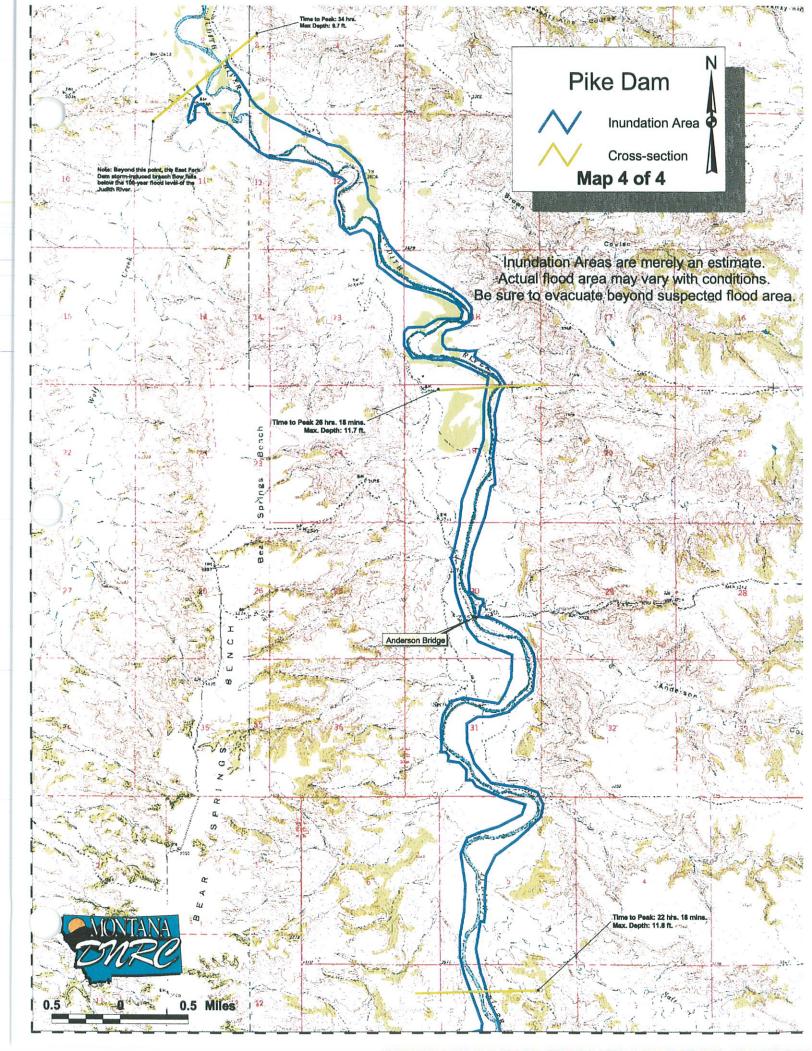
Approximate Scale: Photo = 1 1/2 mile

Evacuations should be made well * Inundation lines are estimates. beyond this zone.









APPENDIX C Telephone Directory

Appendix C TELEPHONE DIRECTORY

A.	<u>Priori</u>	ty One			
	1.	SHERIFF Fergus Cou	inty		535-3415 or 911
	2.	DISASTER AND EM	ERGENCY S	SERVICES Fergus County	
		Cheri F	Cilby		Office: 535-8118
		State Disaster and Em	ergency Servi	ces (Helena)	
	3.	EVACUEES (in upstr	eam-to-down	stream sequence)	3
		Jesse Burleigh Ronald Isackson John Bourke Don Vanek James Sweeney Harry Felton Mitch Maycox Don Knox Don Knechtges David McConnell William Cecil Donald Gregory Kenneth Wise Ruth Wells Frank Williams Gregory Ray Frank Martin JD Moore Ted Dirkson Bill Haugen Marion Gardner Terry Bragg Frank & Betty Martin William Leininger Corrine Trapp	538-2408 535-6907	86 Timberline Rd 98 Timberline Rd 83 Willow Ln 98 Willow Ln 74 Willow Ln 50 Willow Ln 26 Willow Ln 2000 Upper Spring Creek I 131 Dairy Dr.	kd kd
		Don Brown William Youngbauer	538-5962 538-2138	75 Dairy Dr 49 Dairy Dr	

Leroy Thomsen		1108 Roundhouse Rd
Joe Thomas	538-8782	1511 7 th Ave S
Matt Combs		1510 7 th Ave S
Helen Aldrich	538-8565	826 Roundhouse Rd
Wade Kurns		780 Roundhouse Rd
Tim Harrell	538-9567	746 Roundhouse Rd
Vacant		740 Roundhouse Rd
Ed Schwartz	538-5725	619 Roundhouse Rd
Jack Boyce		61 Ash St
James Pearson	535-5352	68 Ash St
John Couch	535-2648	69 Ash St
Janice Weston	535-2456	1798 6 th Ave S
William Solf		71 Ash St
Mike's Transfer	538-5943	84 Ash St
Richard Jennings	538-9626	89 Ash St
Evelyn Deffinbaugh	538-9277	102 Duck Haven Ln
George Jernigan	538-4848	104 Duck Haven Ln
Travis Jaynes	538-8368	103 Duck Haven Ln
David Nilson		105 Duck Haven Ln
George Jimmerson	538-6065	107 Duck Haven Ln
Leona Tripp	538-5076	109 Duck Haven Ln
Torger Oaas	538-8862	1503 7 th Ave S
Charlene Reiche	538-5196	92 Cottontail Ln
William Krings	538-3802	108 Cottontail Ln
Doug Krings	538-3335	124 Cottontail Ln
Ryan Zerr		105 Rainbow Ln
Russ Dunnington	535-9326	103 Rainbow Ln
Fred Tullis	538-3395	101 Rainbow Ln
Monte Boettger	535-3228	121 Mill Stream Rd
Clyde Merwin	538-5206	101 Mill Stream Rd

B. <u>Priority Two</u>

5.

4. LOCAL ENGINEERS

NTL Engineering (Great Falls)	
Mr. Gary Quinn	Office: 761-6555
Morrison Maierle (Helena)	
Mark Franchi	Office: 442-3050
MONTANA DEPT. OF NATURAL RESOL	JRCES AND CONSERVATION
Dam Safety Program Engineers:	Office: 444-6613

	Michele Lemieux, (Soils and Embankments)	Home: 225-9062
		Office: 444-6613
		Cell: 459-3572
	Water Operations Bureau	Office: 444-6816
	Mr. Laurence Siroky, Bureau Chief	Home: 442-2806
		Cell: 431-7475
6.	NATIONAL WEATHER SERVICE	
,	Missoula	329-4718
	Great Falls	453-2081
	Billings	652-2314
	Dillings	
7.	CITY OF LEWISTOWN	
	OLL OF BEHIND OF THE	
	Leo Kapp	Office: 535-1770
	LCO Rupp	Cell: 366-4430

C-4

APPENDIX D Dam Incident Report Form

DAM INCIDENT REPORT FORM

DATE:	TIME:			
NAME OF DAM:				
STREAM NAME:				
LOCATION:	;			
COUNTY:				
OBSERVER:				
OBSERVER TELEPHONE:				
NATURE OF PROBLEM:				
LOCATION OF PROBLE	EM AREA (Looking Downstream):			
EXTENT OF PROBLEM	I AREA:			
FLOW QUANTITY ANI	O COLOR:			
WATER LEVEL IN RES	SERVOIR:			
IS SITUATION WORSE	ENING?			
EMERGENCY STATUS	S:			
CURRENT WEATHER	CONDITIONS:			
ADDITIONAL COMME	CNTS.			

APPENDIX E Plan Distribution List

APPENDIX E

Emergency Action Plan Distribution List

PLAN HOLDER	NUMBER OF COPIES
Dam Owner, City of Lewistown	2
Fergus County Sheriff	
Fergus County DES Coordinator	1
DNRC Dam Safety Program	
DNRC Lewistown Regional Office	1